MACHINE DESIGN

1966 ANNUAL INDEX

Volume 38—January to December

Including 26 regular issues of MACHINE DESIGN plus four special issues—*The Bearings Reference Issue, The Plastics Reference Issue, The Fluid Power Reference Issue, and The Electric Controls Reference Issue.* Only articles and editorial items one-half page or larger are indexed.

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1. Title.
2. Author's last name (see Author Index for complete name). Departments in regular issues are denoted by the following code:
   - Trends .....Trends in Technology or Trends in Design and Development
   - Scan .....Scanning the Field for Ideas
   - DIA .....Design in Action
   - PR .....Picture Report
   - DI .....Design International
3. Date of issue, MACHINE DESIGN *Reference Issues* are denoted by the following code:
   - B .....*Bearings* (March 10)
   - P .....*Plastics* (June 16)
   - FP .....*Fluid Power* (September 22)
   - EC .....*Electric Controls* (December 15)
4. Page Number.
5. Number of pages in article or editorial item.

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New Electric Motor Push-Pulls and/or Rotates a Shaft	Trends	1/20	8	(1.0)
Most Powerful D-C Motor	Trends	6/9	34	(0.5)

12. Power Supplies

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Thin-Film Solar Cells Are Ready for Space Tests	Trends	8/18	14	(0.6)
Electric Fords in 1977	Trends	10/27	12	(2.3)
Electric Vehicles May Evolve from the Military	Trends	12/8	16	(1.0)
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Piggyback Windings Anticipate Flux Saturation	Scan	9/29	128	(1.0)
Operational Wastes Provide Fuel-Cell Recharge	Scan	11/10	198	(1.0)
Servo-Balanced Transformer Eliminates Phase Loss	Scan	11/24	148	(0.5)
First Radioisotope Generator	PR	10/13	4	(0.5)

13. Switches and Relays

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Precision Snap-Acting Switches	Schwarzkopf EC	12/15	15	(6.0)
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Gas-Dampened Vibration Senses Pressure	Scan	10/27	166	(5.0)

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Temperature Transducers	Hartz	9/15	188	(5.0)
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"Undetectable" Soldering Faults are Caught by Infrared Inspection	Trends	8/18	33	(0.8)
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Interlaced Plates Clock Rotational Flutter	Scan	7/7	128	(0.6)
Revolving Sensor Telegraphs Temperature	Scan	7/7	129	(0.5)
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Mercury Sensors Monitor Sinking Buildings	DIA	9/15	50	(0.5)
Projected Light Patterns Verify Readout Numerals	DIA	11/24	36	(1.0)
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Sun-Pumped Laser Will Beam Messages from Mars	Trends	2/17	27	(0.6)
Ruby Laser Upsets the Assumptions	Trends	3/3	8	(0.6)
Luminescence Is Efficient from "Difficult" Class of Semiconductors	Trends	3/31	35	(0.7)
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Laser Pinpoints Distances with "Zero" Error	Trends	5/12	36	(1.0)
Practical Methods of Making Gallium-Arsenide Parts	Trends	6/23	32	(0.5)
Laser Beam Creates a Plasma	Trends	7/21	18	(0.6)
Integrated Circuits Take Over a Numerical Control	Trends	9/1	25	(1.0)
Tripled Efficiency Claimed for Light-Emitting Diodes	Trends	10/13	34	(0.4)
Laser Gyro Aims the Navy's Guns	Trends	10/13	34	(0.6)
Laser Beam Acts Like Electric Arc in Breaking Down Gases	Trends	10/27	24	(0.3)
New Laser Generates Giant Pulses in a Tight Beam	Trends	11/10	32	(0.6)
Integrated Circuits are 'Glued Down' on Glass	Trends	11/10	32	(0.4)
1,500 Percent Growth by '71 Predicted for Integrated Circuits	Trends	12/8	38	(0.5)
Hybrid Integrated Circuits are Slated for Early Extinction	Trends	12/8	38	(0.8)
Improved Methods Boast Transistor Frequencies	Trends	12/8	41	(0.7)
Laser Beam Burns High-Density Data on Tape	Trends	12/22	21	(0.7)
New Seals Boost Reliability of Silicon Devices	Trends	12/22	24	(0.7)
Laser Triggers Large-Power Switch	Trends	12/22	27	(0.7)
Liquid Potentiometer Detects Tilt	Scan	5/26	168	(0.5)
Semiconductor Switches Translate Digital Data to Mechanical Action	DIA	9/15	48	(1.0)

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Contactors	Russo EC	12/15	86	(2.0)
Hybrid Integrated Circuits Go into Mechanized Production	Trends	4/28	36	(0.5)
What the Well-Dressed Cable Should Be Wearing	Trends	9/15	26	(1.5)
Tiny Circuit Reacts in 400 Picoseconds	Trends	11/24	25	(0.5)
Braided Connector Flexes Without Loosening	Scan	1/20	154	(0.5)
Capacitance-Pulse Rate Clocks Shaft Speed	Scan	5/26	147	(1.0)
Connector Modules Simplify Printing Press Assembly	DIA	8/18	36	(2.0)

17. General Components

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Superconducting Magnets	Montgomery	10/13	234	(4.2)
Microencapsulation	Hanny, Huber & Peters	10/27	196	(2.7)
High-Temperature Electrical Materials	Kueser	11/10	222	(3.2)
31-lb Magnet Doubles 1-Tonner's Field	Trends	2/17	24	(0.5)
Heat Pipe Transfers Thermal Energy for Direct Conversion to DC	Trends	3/17	10	(0.5)
Spacecraft Magnets May Tame Re-entry Plasmas	Trends	4/14	35	(0.5)
Ceramic-Sealed Heaters Keep Coffee Hot	Trends	5/12	24	(0.7)
Magnetic Sleeve Heats Cold Conductor	Scan	1/6	115	(0.5)
Lamps Diagnose Circuit Failure	Scan	5/26	168	(0.5)
Electroluminescent Pattern Forms Digits	Scan	7/7	136	(1.0)
Magnetic Shutters Vent Overpressure	Scan	9/1	132	(0.5)
Magnets Manipulate Conveyor Flow	Scan	9/1	115	(0.5)
Magnetic Flux Reversal Switches Contacts	Scan	10/13	198	(1.0)
Magnetic Field Dissipates Damaging Arc	Scan	10/27	156	(1.0)

19. Systems, Drives, Assemblies

Small Engineering Computers	Lavoie	1/20	130	(5.0)
A-C Motor Adjustable-Speed Drives	Zollinger	2/3	116	(9.0)
Which Computer Fits the Job?	Stiefel	4/14	152	(5.0)
Electromechanical Designs	Masterson	6/23	186	(3.5)
The Cycloconverter Adjustable-Speed Drive	Pinter	6/23	150	(8.0)
34 Checks For Handling Electrical Interfaces	Orr	11/10	207	(3.0)
New Hardware Points Out State of the Thermo-electric Art	Trends	1/20	16	(1.0)
A-C Wheel Impresses the Army	Trends	2/3	8	(0.5)
Muscle Currents Control Motor-Driven Hand	Trends	2/3	10	(1.0)
"Curve-Ball" Force Is Spotted in Superconductors	Trends	2/17	12	(0.7)
Built-In Chips Will Monitor Any Aircraft System	Trends	5/12	34	(1.0)
Electric Pulses Hammer Stator Windings into Slots	Trends	5/26	20	(1.0)
Desk-Top Calculators Use Time-Sharing Computer	Trends	12/8	35	(0.4)
Criss-Cross Grid Provides Multi-Contact Pattern	Scan	1/6	144	(0.6)
Magnetic Doughnut Damps Selectively	Scan	4/14	173	(0.5)
Rearranged Image Simplifies Scan	Scan	4/28	214	(1.0)
Electronic Gate Controls Ignition Spark	Scan	5/26	186	(0.5)
Pulsed Pawls Provide Bidirectional Drive	Scan	6/9	140	(0.5)
Electromagnetic Piston Pumps Fluid	Scan	8/4	158	(1.0)
One-Shot Magneto Sparks Lighter	Scan	8/4	162	(1.0)
Pulse Control Conserves Electric Car's Power	DIA	7/7	32	(0.6)

Fluid Drives, Controls and Systems

21, 22. Fluids, Fluid Conditioners

Reservoirs	Lustig	FP 9/22	56	(3.0)
Filters	Dollinger	FP 9/22	59	(2.0)
Heat Exchangers	Davis & King	FP 9/22	61	(3.0)
Fluids	McMacken	FP 9/22	79	(3.0)
Conditioners	Calsten	FP 9/22	103	(5.0)
Super Cooler Closes Gap Toward Absolute Zero	Trends	6/9	30	(1.0)
Conductive Rings Assess Machine Wear	Scan	10/27	194	(1.0)
Shrinking Filter Monitors Sediment Buildup	Scan	12/22	129	(0.5)
LOX Boil-Off Keeps Hot Suit Comfy	DIA	3/3	44	(0.5)
Violent Death	PR	11/24	4	(0.5)
Hyperbaric Bed	DI	11/10	48	(0.4)

23. Fluid Conductors

Pump Selection	Roberts & Hohmann	FP 9/22	7	(3.0)
Pipe, Tubing, and Fittings	Nicol	FP 9/22	64	(5.0)
Hose, Fittings, and Couplings	Cox	FP 9/22	69	(4.0)
NASA Proves Feasibility of Fluid-Carrying Foldable Tube	Trends	10/27	27	(1.8)
Controlled Squeeze Simplifies Sealing	Trends	2/3	28	(1.0)
Threaded Spring Ring Provides Quick Disconnect	Scan	2/17	186	(0.5)
Pliable Sleeve Controls Fluid Flow	Scan	3/31	122	(1.0)
Helical Fins Stop Chimney Shake	DIA	9/15	50	(0.5)

24. Linear Devices

Piston Pumps	Olson & Pease	FP 9/22	16	(3.0)
Accumulators and Boosters	Jacobellis	FP 9/22	19	(7.0)
Linear Hydraulic Actuators	Watson	FP 9/22	26	(5.0)
Linear Pneumatic Actuators	Watson	FP 9/22	90	(3.0)
Heat-Weakened Diaphragm Bursts on Command	Scan	3/17	182	(0.5)
Pulsating Bellows Generates Pneumatic Flutter	Scan	8/4	145	(0.5)
Piston Travel Unlocks Load	Scan	9/29	122	(1.0)
Muffled Pile Driver Keeps Construction Sites Quiet	DIA	12/22	41	(0.4)
High Seas Pool	DI	11/10	49	(0.4)

25. Rotary Devices

High Vacuum Pumps	Arlidge	5/26	154	(7.7)
Gear Pumps	Horn	FP 9/22	10	(3.0)
Vane Pumps	Griffiths	FP 9/22	13	(3.0)
Hydraulic Motors	Manogue	FP 9/22	31	(4.0)
Rotary Actuators	Laughman	FP 9/22	35	(3.0)
Compressors	Taft & Behrendt	FP 9/22	87	(3.0)
Pneumatic Motors	Ringer	FP 9/22	93	(5.0)
Remote Hydraulic Motors	Gay & Long	9/29	118	(4.0)
Laser Pump Absorbs Tube-Shattering Shocks	Trends	3/17	33	(0.8)
New Motor Yields High Efficiency, High Torque at Low Speed	Trends	6/23	30	(1.0)
Hydraulic Hardware Has Power Density of Human Muscles	Trends	11/24	28	(1.0)
Impeller-Mounted Buckets Eliminate Pump Shaft	Scan	4/28	181	(0.6)
Impeller Induces Bypass Flow	Scan	5/26	186	(0.5)
Pentagonal Eccentric Cycles Cylinders	Scan	9/15	193	(1.0)
Single Rotor Provides Multistage Compression	Scan	11/10	219	(0.5)
Pistons Shove Cam Rings to Drive Hub Motor	DIA	9/29	32	(1.0)

26. Seals, Packings, Gaskets

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Hazards to Seal Performance	Dolman	7/7	161	(1.3)
Design Parameters Affecting Seal Operating Temperature	Symons	9/1	146	(0.7)
Sealing with Gaskets	Smoley	10/27	171	(17.0)
Gasket Research Supplies New Design Approach	Trends	10/13	30	(2.0)
Seal Boosts Hydrostatic Bearing Lift	Scan	2/17	186	(0.5)
Combination Spring-Seal Compensates for Pressure Variations	Scan	3/3	142	(0.5)
Fluid Film Preserves Seal Faces	Scan	9/15	187	(1.0)

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Flow-Control Valves	Bartolo	FP 9/22	41	(5.0)
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Controlled Pressure Powers Remote System	Trends	1/6	18	(0.8)
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Flexing Nozzle Cleans Itself	Scan	3/17	163	(0.5)
Beam-Interrupting Slug Measures Flow	Scan	4/14	173	(0.5)
Synchronized Rams Produce Continuous Flow	Scan	6/9	174	(1.0)
Hydraulic Servo Eliminates Shaft Thrust	Scan	8/4	157	(1.0)
Notched Disc Produces Pressure Flip-Flops	Scan	9/29	107	(0.5)
Servo Control Sharpens Regulator Sensitivity	Scan	9/29	107	(0.5)
Diaphragm Valve Regulates Power Boosting LP-Gas Injector	DIA	11/10	37	(1.0)
British Scurry to Comply with U. S. Air-Pollution Laws	DIA	12/8	56	(1.0)

28. Instruments and Controls

Fluidics Today	Long	2/17	163	(8.0)
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Part 2—Analysis of Fluid Flow	Letham	3/3	128	(8.0)
Part 3—Fluid Impedance	Letham	3/17	170	(12.0)
Part 4—Lines, Jets, Coanda Effect	Letham	3/31	116	(6.0)
Fluidics for Industrial Control	Gesell	5/26	202	(3.4)
Fluidic System Design: Part 5—Practical Fluid Resistors	Letham	6/9	134	(5.0)
Part 6—Stream-Interaction Amplifiers	Letham	6/23	171	(4.0)
Part 7—Turbulence Amplifiers	Letham	7/7	157	(3.0)
Part 8—Vortex Amplifiers	Letham	7/21	178	(3.8)
Part 9—Impact Modulators	Letham	8/4	146	(11.0)
Part 10—Miscellaneous Devices	Letham	8/18	169	(8.0)
Part 11—Transducers and Sensors	Letham	9/1	139	(7.0)
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Part 13—Effects of Circuit Elements	Letham	10/27	162	(4.0)
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Fluidic Memory Ignores Power Shut-Off	Trends	7/7	22	(0.5)
Flow-Compensated Floats Measure Viscosity	Scan	1/6	115	(0.5)
Notched Ring Senses Rotary Acceleration	Scan	7/21	182	(0.5)
Magnetic Kick Provides Switch Snap	Scan	7/21	182	(0.5)
Orbiting Ball Telegraphs Flow Rate	Scan	9/1	115	(0.5)
Cascade Regulation Controls Dual Gas Flow	Scan	10/27	166	(5.0)

Shuttling Bead Transfers Fluidic-Memory Data	Scan	11/10	219	(0.5)
Conductive Liquid Generates Own Flow Signal	Scan	12/22	126	(1.0)
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29. Systems and Assemblies

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Power Units	Engebretson	FP 9/22	82	(2.0)
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Hydraulic Drive Shakes Plow to Ease Cable Laying Task	Trends	3/31	29	(1.0)
Fluid Power Fallout from Space Program	Trends	7/21	30	(0.7)
Fluidics Keeps Eagle Eye on Lube System	Trends	9/15	31	(0.5)
On-Board Hydraulics Gives C-5A Built-In Stevedores	Trends	12/8	30	(2.0)
Pumpless Lube System Uses Capillary Flow	Scan	1/6	132	(1.0)
Sinkable Float Controls Water Flush	Scan	3/31	126	(0.6)
Air Jet Powers Suction-Cup Grip	Scan	11/24	174	(1.0)
Gentle Vacuum Lifts without Touching	Scan	12/8	159	(1.0)
Vacuum-Valve Fingers Tickle the Ivories	DIA	3/3	32	(2.0)
Electrically Clogged Valves Make Vibrator Shaft Jump	DIA	3/3	34	(1.0)
Paired Pistons Position Simulator Platform	DIA	4/28	60	(0.7)
Hydraulic Hold-Downs Protect Rock Crusher	DIA	5/26	46	(1.0)
Hydraulic Drive Combines Clutch, Brakes, Differential, and Transmission	DIA	6/9	44	(1.0)

Mechanical Drives, Controls and Systems

31. Engines, Atomic Power, Power Sources

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Coming: The Combustible Rocket Motor.	Trends	2/3	16	(0.5)
SNAP-10A Prototype Sets New Reactor Records	Trends	2/17	10	(0.6)
New Combustion System Upgrades Diesel	Trends	3/3	12	(0.5)
Rocket Belts Make Their Move To Power Two Moon-Surface Hoppers	Trends	3/31	8	(1.0)
Solar-Electric Propulsion Is Judged OK for Mars Probes	Trends	4/14	10	(0.6)
Grounded J-79's Find a Home in a Powerplant	Trends	4/14	12	(0.7)
NERVA Tests Prove Nuclear Propulsion Practical	Trends	4/28	8	(1.0)
SNAP 10-A Completes Record Run	Trends	4/28	14	(0.5)
Rammed-in Air Steers a Booster	Trends	4/28	22	(0.6)
Nuclear-Electric Generator Joins the Army and Goes to Sea	Trends	5/12	14	(1.0)
Feed the Fuel to the Crew First	Trends	5/12	19	(0.5)
Radio Catapults Down a Track to Measure Rocket's Exhaust Noise	Trends	9/15	14	(0.6)
SNAP Turboalternator 'Takes a Breather' after 4700 hr	Trends	9/29	10	(0.5)
Best Fuel for the SST . . . Natural Gas?	Trends	10/13	12	(0.5)
Buried Reactor Wins Army Go-Ahead	Trends	10/13	14	(0.8)
Underwater Powerplants Harness the Ocean Tides	Trends	10/27	24	(0.7)
Quick-Decaying Isotope Shrinks SNAP Designs	Trends	11/10	12	(0.7)
Nuclear Powerplant Sets Military Performance Record	Trends	11/10	14	(0.4)
From Diesels To Giesels: Three New Engines Bow	Trends	11/10	20	(2.0)
Rocket Belt Takes a Load off Man's Shoulders	Trends	12/8	8	(0.7)
New Cermet Igniter Cleans Auto's Exhaust	Trends	12/8	19	(0.7)
Agena Switches to Separate Engines for Course Corrections	Trends	12/8	22	(0.4)
Spike Guides Exhaust Gases out of New Rocket	Trends	12/22	12	(0.7)
Hybrid Rocket Tries out as Target-Missile Engine	Trends	12/22	14	(0.6)
Ceramic Afterburner Cleans Up Engine Exhaust	DIA	3/17	48	(0.6)
Bypass Supercharges Four-Stroke Engine	DIA	6/23	58	(1.0)
Off-the-Shelf Wankel Engines Near Volume Production	DIA	9/1	30	(2.0)
New Formula II	DI	12/8	58	(0.6)

32-34. Drives, Transmissions, Drive Components

Precision Gear Trains:				
Part 1—Gear Selection	Michalec	2/3	126	(10.0)
Part 2—System Design	Michalec	2/17	178	(8.0)
Spur-Gear and Worm Sets	Buckingham	3/3	112	(6.0)
Speed Limits for Chain Drives	Horner	4/14	183	(3.0)
Backlash in Gears	Michalec	4/28	204	(10.0)
Gear Train Accuracy:				
Part 1—Backlash	Michalec	6/9	126	(8.0)
Part 2—Transmission Error	Michalec	6/23	166	(4.0)
Slow-Speed, Roller-Chain Drives	Reibel	8/4	159	(3.0)
Ultra-Precise Gear Ratios	Robinson	12/8	191	(3.0)
Horsepower Losses in Roller-Chain Drives	Archibald	12/22	127	(2.0)
Three-in-One Transmission Smooths Power Flow	Trends	9/15	28	(0.5)
Computer Takes Over Conveyor Design	Trends	10/13	25	(0.4)
Chain Actuator Pushes with Nested Links	Scan	1/6	133	(0.5)
Composite Gear Meters Integral Lubricant	Scan	1/20	154	(0.5)
Dissimilar Vanes Damp Vibration	Scan	2/3	136	(0.6)
Crossed Rollers Accommodate Conveyor Dips and Turns	Scan	5/12	161	(0.5)
Nested Cones Transmit Reversible Torque	Scan	7/21	171	(1.0)
Swiveled Axles Nullify Road Wrinkles	Scan	8/4	145	(0.5)
Gear Train Simulates Crank Mechanism	Scan	9/1	132	(0.5)
Manual Drive Aims Half-Ton Radio-telescope Horn	DIA	7/21	44	(2.0)
"Lawn-Mower" Drive Helps Truck through the Mud	DIA	8/18	42	(1.0)

35. Rotational Components

Basic Bearing Types	DeHart	B 3/10	15	(7.0)
Bearing Materials and Properties	Booser	B 3/10	22	(7.0)
Cast Bearings	Hudak	B 3/10	29	(6.0)
Strip-Type Bearings	Pesek	B 3/10	35	(5.0)
Powder-Metal Bearings	Johnson	B 3/10	40	(5.0)
Plastic Bearings	Carswell	B 3/10	45	(4.0)
Radial Ball Bearings	Savard	B 3/10	49	(2.9)
Angular-Contact Ball Bearings	Bakewell	B 3/10	52	(3.0)
Thrust Ball Bearings	Knotts	B 3/10	55	(2.0)
Instrument Bearings	Pierson	B 3/10	57	(7.0)
Unground Ball Bearings	Smith	B 3/10	64	(2.0)
Cylindrical and Journal Roller Bearings	Biesmeyer	B 3/10	66	(4.0)
Self-Aligning Spherical Roller Bearings	Heinlein	B 3/10	70	(3.0)
Tapered Roller Bearings	McKelvey	B 3/10	73	(4.9)
Thrust Roller Bearings	Greiner	B 3/10	78	(4.0)
Needle-Roller Bearings	Glazier	B 3/10	82	(5.0)
Premounted Bearings	Lower	B 3/10	87	(5.0)
Rolling-Element, Linear-Motion Bearings	Hope	B 3/10	92	(3.0)
Hydrostatic Gas Bearings	Rieger	3/31	106	(10.0)
Thrust Bearings:	Rippel			
Part 1—Configurations and Performance Variables		4/14	175	(8.8)
Part 2—Optimum Performance and Acceptable Design		4/28	197	(7.0)
Part 3—Lubricant Temperatures and Heat-Balance Techniques		5/12	209	(7.0)
Part 4—Procedure for Optimum Design		5/26	190	(12.0)
Part 5—Performance Evaluation		6/9	141	(7.5)
Slip Clutches	Bickford	7/21	172	(6.0)
Shear Necks	Kent	9/1	138	(1.0)
Thrust Bearings:	Rippel			
Part 6—Flat-Pad Design and Analysis		9/1	122	(10.0)
Part 7—Misaligned Plain Thrust Bearings		9/15	207	(15.0)
Part 8—Fixed and Movable Types		9/29	123	(5.0)
Rolling-Element Bearings	Zaretsky	10/13	205	(19.0)
Partially Lubricated Thrust Bearings	Rippel	11/24	139	(6.0)
Quick Test Shows Inherent Weaknesses in Brake and Clutch Friction Materials	Trends	4/14	18	(0.7)
"Flying Boxcar" Will Test Air-Cushion Landing System	Trends	5/12	10	(1.0)
Fold-Up Spare Saves Auto Trunk Space	Trends	10/27	8	(0.4)
Wrapped Bands Shrink One-Way Clutch	Trends	11/24	19	(1.0)
Twisting Sleeve Senses Torque	Scan	4/14	159	(0.6)
Negative-Rate Spring Regulates Torque	Scan	8/4	139	(1.0)
Steerable Rollers Switch Conveyor Flow	Scan	8/18	148	(1.0)
Mismatched Splines Lock Shaft Joint	Scan	9/15	206	(1.0)
Buckling Diaphragm Shifts Shaft Coupling	Scan	10/13	228	(1.0)
Pawl Mechanism Cancels Brake Wear	Scan	11/10	192	(1.0)
Rolling Balls Soften Coupled Acceleration	Scan	11/24	148	(0.5)
Spinning Flexures Control Linear Thrust	Scan	12/8	189	(0.6)
Fail-Safe Bogie Won't Let Trailer Down	DIA	4/14	56	(1.0)
Suspension System Gives Negative Camber When Cornering	DIA	5/12	49	(0.6)
Radial-Ply Tire Carries Detachable Tread	DIA	5/26	44	(1.0)
Vacuum-Actuated Brake Stops Car Creep	DIA	9/15	46	(1.0)
Bug Makers Bow to U. S. Safety Regulations	DI	10/13	40	(0.4)

36, 37, 39. Mechanisms, Controls, Systems

Determining Minimum Cam Size	Fenton	1/20	155	(4.0)
Joystick Maneuvers, Speeds, and Brakes a Sub	Trends	1/20	10	(0.7)
Apollo Docking Is Simulated with "Air-Bearing Spacecraft"	Trends	8/4	12	(0.6)
"Mohole Anchor" Finds a Job in Industry	Trends	8/18	18	(0.7)
Electrostatic Gyro Coasts for Three Years	Trends	12/22	10	(0.5)
Eccentric Lever Adjusts Precise Cutter	Scan	1/20	166	(0.7)
Skewed Rollers Propel Actuator	Scan	2/3	114	(0.5)
Tapered Cam Controls Feedback	Scan	2/17	162	(0.6)
Rolling Ball Monitors Tilt	Scan	6/23	170	(1.0)
Sandwiched Ring Cuts Seal Rub	Scan	6/23	175	(0.5)
Stepped Fulcrum Lifts Load	Scan	7/7	115	(1.0)
Crossed Cam Slots Convert Linear Motion	Scan	8/18	164	(0.5)
One-Turn Gear Set Simplifies Divider Index	Scan	10/13	178	(0.3)
Linkage Generates Hesitation Output	Scan	12/8	194	(1.0)
Spring-Controlled Drum Peels Backing Tape	DIA	1/20	34	(1.0)
Oscillating Paddle-Wheel Tests Thin-Strip Fatigue Life	DIA	3/3	41	(1.0)
Linkage Prevents Common Typing Goofs	DIA	4/14	50	(2.0)
Rolling Cylinder Reduction System Positions Lens	DIA	7/7	28	(1.0)

Assembly Components

41-43. Fasteners, Springs, Misc.

Fastening Gears	Michalec	1/6	139	(5.0)
Hairspring Design	Raedy	5/12	202	(6.0)
Squeeze-Film Damping	Sommer	5/26	163	(4.8)
Poor Spring Performance	Johnson & Joerres	8/4	132	(7.0)
Fatigue in Bolts	Walker & Meyer	9/15	182	(5.0)
Maximum Bolt Tension	Bazaz	9/29	129	(1.5)
Freedom in Bolted Joints	Dinter	10/27	189	(4.8)
The Future of Fasteners	Sproat	12/22	107	(16.0)
Self-Consuming Shock Absorber May Win LEM-Landing Assignment	Trends	5/12	8	(0.5)
New Process Cuts Cost of Drive Rivets	Trends	7/21	32	(0.7)
Threaded Cap Strengthens Plastic Boss	Scan	3/17	151	(0.6)
Recurrent Images Freeze Vibration Peaks	Scan	5/12	170	(0.5)
Integral Jack Jams Locknut	Scan	6/23	165	(1.0)
Single Bolt Secures Strut Cluster	Scan	6/23	176	(1.0)
Midair Collision Eliminates Forge Shock	Scan	9/15	222	(1.0)
Gimbal Isolates Mirror-Adjust Axes	Scan	11/24	138	(1.0)
Experimental Truck May Triple Freight-Train Speed	DIA	9/1	35	(1.0)
Skiers Need Not Pray for Snow	DIA	11/10	42	(1.0)
Cage-Wheels Prevent Tractor Bog Down	DIA	11/10	46	(0.4)
X-ray System Checks Explosive Bolts	DIA	12/22	41	(0.6)

Materials

51, 52. Ferrous, Nonferrous Metals

Aluminum Castings	(Article)	5/12	191	(3.0)
Investment Casting Metals	Broad	6/23	177	(7.0)
Stainless Steel Welds	Reid	11/10	193	(5.0)
Malleable-Iron Parts	Hunsaker	11/24	170	(4.0)
Boron Filament Winds up in a Rocket	Trends	1/6	12	(0.5)

53. Plastics

The New Plastics	Dreger	1/20	144	(10.0)
Fiberglass-Reinforced Nylon	Metz	2/17	187	(6.0)
ABC's of Plastics	Elliott	4/28	188	(9.0)
Embedding Processes and Materials	Harper	6/9	149	(25.0)
Selecting Plastics	Fox	P 6/16	4	(8.0)
Designing with Plastics	(Chapter)	P 6/16	12	(6.0)
Laminated Plastics	Muller	P 6/16	31	(5.0)
Reinforced and Filled Plastics: Thermosets	Sprang & Davis	P 6/16	36	(2.6)
Thermoplastics	Murphy	P 6/16	38	(4.4)
ABS	Whitney	P 6/16	43	(3.0)
Acetals	Kjellmark	P 6/16	46	(3.0)
Acrylics	Pierson	P 6/16	49	(2.0)
Cellulose Acetate	Black	P 6/16	51	(1.7)
Cellulose Propionate	Black	P 6/16	52	(1.1)
Ethyl Cellulose	Bird	P 6/16	53	(1.9)
Cellulose Acetate Butyrate	Hill	P 6/16	55	(1.3)
Chlorinated Polyether	Hanna	P 6/16	57	(2.0)
Ethylene-Vinyl Acetate	Pilaro	P 6/16	59	(1.0)
TFE-FEP Fluorocarbons	Lovell	P 6/16	60	(5.0)
CTFE Fluorocarbons	Bringer	P 6/16	65	(2.0)
Ionomers	Kinsey	P 6/16	67	(1.0)
Nylons	Carswell	P 6/16	68	(4.0)
Parylenes	Gorman	P 6/16	72	(1.0)
Phenoxies	Henriques	P 6/16	73	(1.0)
Polyallomers	Vermillion	P 6/16	74	(1.0)
Polycarbonates	Kunze	P 6/16	75	(2.0)
Polyethylenes	Estes	P 6/16	77	(4.0)
Polyimides	Todd	P 6/16	81	(3.0)
Polyphenylene Oxides	Shenian	P 6/16	84	(2.0)
Polypropylenes	Jones	P 6/16	86	(3.0)
Polystyrenes	Otting	P 6/16	89	(4.0)
Polysulfones	Walton	P 6/16	93	(2.0)
Vinyls	Bulkley	P 6/16	95	(5.0)
Alkyds	Beers	P 6/16	100	(2.0)
Allylics	Beacham	P 6/16	102	(2.0)
Aminos	Sunderland	P 6/16	104	(3.0)
Epoxies	Reese	P 6/16	107	(2.0)
Phenolics	Bainbridge	P 6/16	109	(3.0)
Polyesters	Thornton	P 6/16	112	(3.0)
Silicones	Kin	P 6/16	115	(2.0)
Urethanes	Backus	P 6/16	117	(3.0)
TFE-Lubricated Thermoplastics	Lomax & O'Rourke	6/23	158	(7.0)
Synthetic Materials	Rondeau	7/21	154	(10.0)
Molecular Orientation in Plastic Parts	Paulson	10/13	190	(8.0)
Whisker-Reinforced Plastics	Wohrer, Frechette, & Economy	12/22	138	(2.3)
Plastic Gas Tanks May Soon Appear in Cars	Trends	2/17	30	(0.5)
Photosensitive Plastic Makes Precision Tachometer Disc	Trends	5/12	26	(0.5)
Fiberglas Earns Its Dolphins	Trends	6/23	8	(1.0)
Nylon Eliminates Springs in Indicator Switch	Trends	6/23	26	(0.7)
Smooth Road Ahead for Plastic Gas Tanks	Trends	7/7	24	(0.7)
"Off-the-Shelf" Fiberglas Yacht Wins Racing Crown	Trends	9/1	12	(0.6)
Reinforced Plastics to Keep Subway on Course	Trends	9/1	19	(0.5)
New Amide-Imide Plastics Stay Strong at 600 F	Trends	10/27	32	(0.6)

54-56. Elastomers, Joining Materials, Others

Structural Adhesives and Composite Materials	Roseland	3/17	189	(3.2)
Fiber-Glass Fabrics	Horton	3/31	152	(2.8)
Thermoplastic Elastomers	Luftglass	4/14	194	(4.1)
Sodium Looks Promising as a Practical Conductor	Trends	1/6	24	(0.5)
Foam and Rubber Team Up to Reduce Auto-Race Fire Hazards	Trends	4/28	10	(0.6)
Anaerobic Adhesives Go Structural	Trends	6/9	23	(0.6)
Graphite Proves Effective as a "Laser Saver"	Trends	7/7	26	(0.5)
Scratched-Glass "Pressure Hull' Survives Deep Submergence	Trends	7/21	21	(0.6)

57. Finishes, Coatings, Lubricants

Oils and Greases	Dunham	B 3/10	4	(4.5)
Solid and Bonded-Film Lubricants	DiSapio	B 3/10	8	(3.5)
Decoration and Surface Finish	Scharnberg	P 6/16	28	(3.0)
Heavy-Metal-Derivative Solid Lubricants	Magie	12/8	203	(3.8)
New "Grease" Meters Lube Oil to Sleeve Bearings	Trends	3/3	24	(0.5)
New Finish Adds Life to Aluminum Electrical Parts	Trends	3/3	28	(0.6)

58. Prefabricated Forms

Tubing For Mating Parts	Fling	2/3	111	(4.0)
Perforated Metals	Siebert	3/17	152	(7.0)
Milled Contour Strip	Hood	5/26	187	(3.0)
Ceramic-Metal Composites	Smith	9/15	201	(5.0)
Compensating Bimetal Elements	Wiedemann	12/22	123	(3.0)
Evaporated Film Promises Better Photos	Trends	2/3	12	(0.5)
Wind-Out Columns Gain Favor as Space Antennas and Supports	Trends	7/7	14	(0.5)
Bricked-up Pressure Hull Survives Deep Submergence	Trends	9/1	8	(1.0)
Rigid Solar Mirror is 'Shaved Thin' Out of 1-in. Magnesium	Trends	9/15	12	(0.8)
Man Bites Dog—Steel Replaces Plastic	Trends	9/15	22	(0.7)
Coating Stops Tape Breakage in Short-Landing System	Trends	12/22	14	(0.4)
Corrugated Sheets Form Compound Curves	Scan	1/20	164	(0.5)
Capacitive Tape Senses Tank Leaks	Scan	5/12	170	(0.5)
Wetted Tapes Form Ribbon Battery	Scan	6/9	148	(0.5)
Multiple Nets Snare Runaway Aircraft	DIA	5/26	42	(1.0)
Collapsible Tube to Make Rigid Spacecraft Boom	DIA	7/21	50	(1.0)

Manufacturing Methods and Processes

61-63. Metals Casting, Shaping, Forming

Steel Castings	Briggs	3/31	123	(3.0)
Filament-Wound Parts	Garritano	4/14	166	(7.0)
Explosive Forming	Rassmussen	4/28	254	(2.3)
Aluminum Castings	(Article)	5/12	191	(3.0)
Properties of Powder-Metal Parts	Feir	6/9	178	(3.2)
Aluminum Impact Extrusions	Hall	8/4	140	(5.0)
Magnetomotive Forming Developments and Magnetohydraulic Forming	Schwinghamer	9/29	151	(0.7)
Castings With Inserts	Seal	10/27	157	(5.0)
Low-Cost Core Produces Die-Cast Threads	Trends	1/20	22	(0.6)
Cold-Forming Produces Wide Range of Gears	Trends	3/17	22	(0.7)
New Process Casts Single-Crystal Parts	Trends	3/31	32	(0.5)
Die Casting of Ferrous Metals Approaches Commercial Reality	Trends	6/9	26	(0.8)
High-Density Diecastings Made by New Process	Trends	8/4	29	(0.5)
High-Density Diecastings Now Ready for the Tough Jobs	Trends	9/15	25	(1.0)
Cast-Weld Method Produces 35-Ton Pump Casings	Trends	10/13	28	(0.5)
Powered Knuckles Squeeze Metal Gloves	Scan	11/24	169	(1.0)
Rocking Dies Reduce Billet Size	DIA	11/10	40	(1.0)
Electron-Beam Welder Works Well in Space	Trends	10/13	12	(0.5)
Drop Smasher Quenches Metals at 1,000,000 Deg per Sec.	Trends	11/10	25	(1.0)
Tig-Quality Welds Made At Mig Speeds	Trends	11/10	29	(0.4)
Zippered Seam Strengthens Extendible Boom	Scan	3/17	163	(0.5)
Friction Weld Bonds Packing Case Bands	DIA	7/21	48	(1.0)
Tiny Sand Blaster Cleans or Cuts Precision Parts	DIA	11/10	43	(1.0)
Ram-Mounted Tool Grinds out Die-Making Electrodes	DIA	11/24	39	(1.0)

64-66. Metals Joining, Removal, Treating

Dip-Brazed Aluminum Assemblies	Krebs	8/18	158	(6.0)
Assembling with Adhesives	Sharpe	8/18	178	(23.0)

67-69. Metals Finishing, Plastics Processes

Embedding Processes and Materials	Harper	6/9	149	(25.0)
Forming and Fabricating Plastics	Carlyon	P 6/16	18	(4.0)
Plastics Assembly Methods	(Chapter)	P 6/16	22	(6.0)
The Staggering Scrap Spectacle	Barnes	7/7	116	(6.0)
Bias-Sputtered Thin Films	Seeman	9/15	225	(3.7)
Technology in Turmoil: Producing the Impossible	Khol	9/29	131	(20.0)
Flame Spraying	Dennison	12/8	168	(5.0)
Process Promises Durable Plating on Aluminum	Trends	1/6	20	(0.7)
Shake-and-Spin Technique Fills Stator Voids with Insulation	Trends	8/4	32	(0.7)
Two More Plastics Join 'The Platables'	Trends	12/8	28	(1.0)
Black Chrome Plate Absorbs up to 97% Light	Trends	12/22	18	(0.7)
Card-Programmed Plating System Uses Leap-Frog Conveyor	DIA	10/27	40	(2.0)

Design Theory and Techniques

71, 72. Mechanics, Strength of Materials

Fatigue Stresses from Complex Loadings	Little	1/6	145	(5.0)
Strength of Screws and Tapped Holes	Lipari	1/20	167	(3.7)
Vibration Reduction Techniques	Baumann	1/20	172	(4.1)
Materials That Creep	Alexander	3/3	120	(8.0)
Factor Of Safety	Little	7/21	165	(6.0)
Noise Measurement Methods	Ranz	11/10	199	(7.7)
Center of Gravity by Photography	Nachtigall	11/24	145	(3.0)
The True Design Strength of Materials and Joints	Smith	12/8	181	(8.4)
Exploding Foil Tips Off Nuclear-Shock Secrets	Trends	6/23	14	(1.0)
Truck-Crash Survey Shows the Driver is Too Often Mangled	Trends	10/13	14	(0.5)
Magnetic Fields Support Wind-Tunnel Model	DIA	1/6	30	(0.5)
Fail-Safe Design	DIA	2/17	38	(4.0)
Gun Blast Opens Pilot's Parachute	DIA	4/14	54	(1.0)

74. Human Factors Engineering

The Disposal Gap	Barnes	3/17	144	(7.0)
Packaging a Delicate Payload	Wise	6/9	120	(6.0)
New Deep-Diving Hardware	Barnes	8/4	124	(8.0)
Relieving Acoustic Fatigue	Tolhurst	8/4	168	(3.6)
"Living" Manikin Will Let Young Physicians Practice	Trends	1/20	14	(0.7)
Train in a Tunnel Is Like a Plane in a Dive	Trends	2/3	8	(0.5)
Reasons Are Cited for the Auto-Exhaust Rebellion	Trends	2/3	16	(0.5)
Bring Back the Electric Auto	Trends	5/26	22	(0.5)
LEM Life-Support System Is Ready for the Moon Flight	Trends	7/7	14	(0.8)
Bolted-on Armor Protects Chinook Crews and Equipment	Trends	7/7	16	(1.0)
FAA Suggests Revising Aircraft Safety Rules	Trends	9/1	14	(0.6)
Bagging a Spaceman	Trends	9/29	10	(0.5)
Helicopter Escape System Proves Feasible	Trends	10/13	8	(0.7)

75. Design Analysis and Synthesis

Network Planning Techniques	Magnus	1/6	102	(9.0)
Watt's Linkage Analysis	Amort	2/3	115	(1.0)
Natural Frequencies of Cantilever Bars	Weindling	2/3	137	(3.4)
Calculating Link Lengths	Li	2/17	193	(2.0)
Natural Frequencies	Hassoun	3/3	143	(2.0)
Man-Computer Graphic Communication	Chasen	3/3	145	(2.8)
Statistical Jargon	Ahlbeck	3/17	159	(4.0)
Unsymmetrically Loaded Beam Deflections	Cuppan	3/17	183	(3.5)
Determining Linkage Proportions	Timko	3/31	127	(3.8)
Thin-Plate Natural Frequencies	Vet	6/9	175	(3.0)
Gear Train Accuracy: Part 3—Total Gear-Train Position Error	Michalec	7/7	130	(5.8)
Slow-Speed, Roller-Chain Drives	Reibel	8/4	159	(3.0)
Time-Sharing of Computers	Lavoie	8/18	140	(8.0)
How to Talk to a Computer	Wasserstrom	10/27	140	(6.0)
The Odds against Fracture, or Predicting Strength of Brittle Structures	Barnett, Costello & Herman	11/10	184	(7.6)
Industry Sponsors Graphic Symbols for Fluidics	Trends	4/14	29	(2.0)
Make-Believe Boat Proves Its Hydrofoils Stable	Trends	5/26	14	(0.7)
Prepackaged Programs Reduce Math Leg-Work	Trends	5/26	24	(0.5)
Lockheed Talks Over Its SST Design	Trends	7/21	10	(1.6)
Models Simulate 'Fantastic Voyage' Inside Molten Metals as They Cool	Trends	11/24	22	(0.7)

76. Basic Sciences

The Search for Extraterrestrial Life	Wise	7/21	148	(6.0)
Superconductive Devices	Flynn	8/18	202	(5.0)
Cryosurgery	Barron	10/13	184	(6.0)
Cryobiology	Barron	10/27	150	(6.0)
Optical Choppers	Cade	10/27	167	(4.0)
Fiber Optics Replace Lens in New Oscilloscope	Trends	10/27	21	(0.4)
Cannon-Fired Ground Wire Might Turn off a Tornado	Trends	11/10	10	(1.0)
Trapped Light Traces Liquid Level	Scan	7/21	164	(1.0)
Hole-less Mask Crops Optical Field	Scan	8/18	164	(0.5)
Prism Array Forms Movement Multiplier	Scan	12/8	190	(1.0)
No-Blur Film Editor Relies on Precision Casting	DIA	9/29	35	(1.0)
Pollution Clean Up	DI	10/27	48	(0.3)
Open-Heart Surgery Patient "Breathes" with Membrane-Drum Lung	DIA	12/22	32	(1.0)

77. Experimental, Advanced Design

The Plight of Fundamental Research	Raudsepp	8/18	149	(3.0)
Automakers Shun Road and Track for Design/Durability Testing	Wise	8/18	152	(6.0)
Stand-ins for Product Testing	Reinert	9/1	116	(5.5)
Industry, Government, & the Engineer... Part 3: Coping with Government Contracts	Raudsepp	10/13	179	(5.0)
Fastest Gun in a Wind Tunnel Creates Back-from-the-Planets Speeds	Trends	8/18	10	(0.7)
Iron Bird 'Flies' Boeing 737 Control Systems	Trends	11/24	8	(1.0)
'Sports Tractor' Tows Predictable VTOL Prop	Trends	12/22	10	(0.5)
Emergency Procedures	PR	12/8	4	(0.7)

78. Environmental Design

Designing for Extreme Environments	Kee	2/17	196	(4.6)
Immaculate Voyager Will Visit Mars	(Article)	3/3	106	(6.0)
Human Factors Shape MOLAB	Seminara	5/26	148	(6.0)
New Deep-Diving Hardware	Barnes	8/4	124	(8.0)
Stopping Metal Corrosion	Suss	10/13	199	(5.0)
Humanizing a Moon Rover	Seminara	11/24	124	(5.0)
Newly Christened, Deepstar-4000 Prepares for Chartered Dives	Trends	1/6	8	(1.0)
New Hardware is Needed for Harvesting the Sea	Trends	1/6	10	(0.5)
Apollo Backpack Sustains Trotter Three Hours	Trends	1/6	14	(0.8)
Study Groups Urge Ten-Year Lunar Exploration	Trends	2/3	14	(0.5)
Recovery Systems Are Ready for the Returning Moon Craft	Trends	2/3	14	(0.5)
State-of-the-Art Rescue Rocket Could Double as Service Craft	Trends	2/17	8	(0.5)
Seven Experiments Are Chosen To Be Left Behind on the Moon	Trends	2/17	16	(0.6)
Reusable Spacecraft Would Accelerate Slowly	Trends	3/17	10	(0.5)
Two Volunteers Try 21 Days in a Moon Rover	Trends	3/17	12	(0.6)
Follow the Bouncing Doughnuts	Trends	3/31	10	(0.7)
Life Support Know-How Is Put to the Test	Trends	3/31	14	(0.7)
"Apollo Classrooms" Are Ready To Test Spacecraft and Crews	Trends	3/31	16	(0.6)
Scuba Researchers Dive 400 ft in a Landlocked Lab	Trends	4/14	14	(1.3)
Post-Apollo Project Evaluates Lunar Hardware, Catalogs State of the Art	Trends	4/14	16	(0.7)
"Open-Minded" Spacecraft Reports, Then Earth Designs the Next Test	Trends	4/28	12	(1.0)
Balsa Geometry Is Called Critical for the Mars-Impact Capsule	Trends	4/28	18	(0.7)
Picture Snapping on Mars Will Expose Film on Earth	Trends	5/12	12	(0.6)
"Iron Pants" Protect Against Backpack Exhaust	Trends	6/23	10	(0.7)
First Manned Glass Submarine Will Flash Orders via Light Beams	Trends	8/4	10	(1.0)
Titanium Pressure Vessels Try Buoying a Deep Diver	Trends	9/15	16	(0.5)
Parachuting Capsule 'Lands on Mars' in Earth's Upper Atmosphere	Trends	9/29	14	(0.7)
Stand-Ins Don Space Garb for Endurance-in-a-Vacuum Checks	Trends	10/13	10	(0.6)
Spacecraft Testers Take a New Look at the Sun	Trends	10/13	16	(1.0)
Future Surveyors Will Park before Blasting for the Moon	Trends	10/27	8	(0.6)
'Real Ocean' Is Created in Tiny Tank	Trends	11/10	16	(0.5)
'Tinker Toy' Space Station May Be Grown out of Old Freighters	Trends	12/22	8	(1.0)
Astronauts Train in Computer-Controlled Universe	DIA	8/4	42	(2.0)
Instrumented Raft Rules the Waves	DIA	8/18	40	(1.0)
Earth Model	PR	11/10	4	(0.4)

Engineering Management, Personal

81. Engineering Department Operations

Engineering Supervision: Part 3—Improving the Supervisory-Management Position	Raudsepp	1/6	111	(4.0)
Appraising Managerial Talent	Raudsepp	2/3	93	(8.0)
Continuing Education for the Engineer	Gilmore	2/17	154	(2.0)
Engineers Predict Problems of the '70s	Raudsepp	3/3	102	(4.0)
Technology in Ten Years	Raudsepp	3/17	138	(4.0)
Keeping Up with Knowledge	Raudsepp	3/31	96	(4.0)
Selling Ideas to Management: Part 1—Preparing for the Premiere	Raudsepp	4/28	173	(4.0)
Part 2—On Stage		5/12	156	(5.5)
Getting Results through People	Berra	5/12	218	(2.8)
Soft-Sell Recruiting	Raudsepp	6/9	116	(4.0)
Recruitment Ads That Engineers Read	Raudsepp	7/7	110	(5.0)
Top Technical Talent	Marvin	8/4	120	(4.0)
Effective Engineer Teams	Raudsepp	9/1	100	(4.0)
Industry, Government and the Engineer: Part 1—Why Work for the Government	Raudsepp	9/15	169	(4.0)
Part 2—Doing Business with the Government		9/29	103	(4.0)
Reducing Technical Turnover	Berenson	9/15	162	(7.0)
Persuasive Communication	Lopata	9/29	100	(3.0)
Industry, Government and the Engineer: Part 3—Coping with Government Contracts	Raudsepp	10/13	179	(5.0)
Interviewing Engineers: A Lesson in Diplomacy	Charkey	11/10	166	(4.0)
Engineers Okay Overtime	Charkey	11/10	170	(6.0)
A New Look at Cooperative Education	Greenwald	11/24	118	(3.0)
Effective Engineering Budgets	Myers	12/8	152	(4.0)
Management Clinic	Desi	12/8	156	(3.0)
Engineers Appraise Their Working Atmosphere	Barnes	12/22	92	(6.0)
1965 Graduates Choose Higher Education over High Pay	Trends	1/6	16	(0.7)
Salary Increases Are Measured in Dollars and Percentages	Trends	2/3	18	(0.7)
Recovery from Layoffs—Boeing and Boston	Trends	3/3	19	(0.7)
Effects of Technology on Economy Are Reported	Trends	4/28	24	(0.5)
Engineers Are Harder To Hire This Year	Trends	6/23	22	(0.8)
Technician's Salary Can Exceed $13,000 per Year	Trends	8/18	21	(0.7)
Evolution in Engineering Education	Trends	9/1	16	(1.0)
'Second Sources' of Engineering Talent Can Prevent Technological Underachievement	Trends	10/27	19	(1.0)
High Demand for Engineers Promises To Continue	Trends	11/10	19	(0.7)
Engineers Should Be Educated for Leadership	Trends	11/24	16	(0.9)
Managers Charged with Youth Career Guidance	Trends	12/8	25	(0.8)
Engineer Index Goes Up Again	Trends	12/22	16	(0.7)

82-84. New Products, Drafting, Testing

A Case for Coexistence	Roden	2/17	148	(6.0)
Advise and Consent Function in Design	Kupetzky	5/26	138	(4.0)
Boundary Concept of Position Tolerance	Liggett	10/13	174	(4.7)
Marketing Men vs. Design Engineers	Putnam	12/22	98	(2.0)
Design Automation Available Off-the-Shelf	Trends	1/6	26	(0.7)
Lens Zooms In at Mach-4 While Testing Missile Homing Device	Trends	5/26	16	(0.8)
Best Power-Steering Ratio Is Sought on Instrumented Course	Trends	7/21	8	(1.0)
Pencil Records Position As It Traces Lines	Trends	7/21	28	(0.5)
New Drawing Standard Introduces Six New Symbols	Trends	10/13	22	(0.3)
Noise Generator Simulates Rocket Blast	DIA	3/17	43	(1.0)
No Plumbing Needed for Table-Top Dark Room	DIA	10/27	35	(1.0)

85. Technical Information

Identification of Parts and Drawings	Simonton	1/20	159	(5.0)
A Defense of Knowledge	Gallagher	3/17	142	(2.0)
File Now—Find Later	Burgess	4/28	176	(5.0)
Field Failure Reports	Zawacki	6/23	136	(5.0)
What's Wrong With IR?	Berul & Sayer	7/7	106	(4.0)

Parts Identification Systems	Pohs	7/21	142	(6.0)
Information Systems	Liston	7/21	190	(4.0)
The Art of Active Listening	Olson	9/1	104	(2.0)
Graphic Symbols	Long	FP 9/22	4	(3.0)
USASI Heads Standards Team; Federal Charter Next	Trends	10/13	19	(1.7)
Pneumatics Manufacturers Strive for Standardization	DI	10/13	40	(0.3)

86, 87. Patents, Personal, Professional

Registration, Reciprocity, and the Nomadic Engineer	Constance	1/20	135	(3.0)
Personal Outlook	Raudsepp	4/14	157	(2.0)
Creativity and the Critical Attitude	Raudsepp	5/26	142	(5.0)
Our Ailing Patent System	Thomas	6/23	141	(3.0)
Industry, Government and the Engineer: Part 4—Attitudes on Ethics	Raudsepp	10/27	146	(4.0)
Teamwork Stiffles Creativity	Raudsepp	11/24	121	(3.0)
Personal and Career Development	Huse	11/24	176	(2.8)
Engineer's First Degree Should Be Master's	Trends	3/17	19	(0.8)
Design Conference '66 Looks to the Future	Trends	4/14	26	(1.0)
Survey Reveals Management Attitudes toward Inventor Royalties	Trends	6/9	20	(1.0)
Changes Proposed for International Patents	Trends	7/7	20	(0.8)
NSPE Delegates Approve New Membership Criteria	Trends	9/29	16	(0.7)

Specific Machines and Equipment

911. Ordnance

Anti-Missile Missile	(Article)	1/6	116	(4.0)
Breakthrough in Small Arms	Barnes	1/6	120	(4.0)
Mock War Machines	(Article)	4/14	160	(6.0)
Supercold Rocket Passes Hot Start and Restart Tests	Trends	2/17	8	(0.5)
A Gemini First: Splashdown in Pacific	Trends	3/31	12	(1.0)
Ten-Nike "Bowstring" Launches Mach-2 "Arrowhead" Sled	Trends	8/4	8	(0.8)
Cannon Launcher Cuts Rocket Weight by 10:1	Trends	9/15	10	(0.6)
007-Style Shotgun Built for Rough Handling	DIA	1/6	32	(1.0)
Dual-Position Hammer Adjusts Gas Gun's Hitting Power	DIA	1/20	44	(2.0)
Interchangeable Parts Make Six-in-One Weapons System	DIA	3/31	46	(2.0)
Rifle Redesign Benefits from Combat Experience	DIA	5/12	40	(2.0)
T-Bolt Rifle Revives Straight-Pull Action	DIA	9/15	42	(2.0)
Missile Quartet	DI	10/27	45	(0.3)

912. Machinery

The Great Garbage Explosion	Barnes	2/3	100	(10.0)
Machines That Walk	Barnes	2/17	156	(6.0)
The Staggering Scrap Spectacle	Barnes	7/7	116	(6.0)
Master and Slave See the Same Scene Even While Both Turn Their Heads	Trends	3/17	14	(0.7)
Nuts Move through Tapping Machine in Continuous Flow	Trends	7/7	29	(1.0)
'Tractor of Tomorrow' Tests Farmer's Reactions	Trends	9/15	16	(0.5)
Tiny Turbine Turns Trees into Toothpicks	Trends	11/24	10	(0.4)
Crossed Chutes Mix Materials	Scan	3/3	118	(1.0)
Starwheels Control Feeder Traffic	Scan	5/12	216	(1.0)
Suspended Pivots Rotate Zero-Torque Sling	Scan	8/18	168	(1.0)
Regulated Roller Coaster Avoids Foamy Fill	Scan	10/27	188	(1.0)
Orbiting Pins Store Process Memory	Scan	12/8	173	(1.0)
Contactless Communication System Links Crane Cab to Shop Floor	DIA	1/6	35	(0.5)
Alligator Shear Snips Contaminated Pipe	DIA	1/6	35	(0.5)
Tractor-Mounted Spade Eases Tree-Moving Chore	DIA	2/3	32	(1.0)
Hot Ride on Vacuum Cart Speeds Color-TV Tube Production	DIA	2/3	35	(1.0)
Rug Pattern Sprouts from Air-Jet Needles	DIA	2/17	44	(1.0)
Probe-Triggered Blade Whacks Out Unwanted Plants	DIA	4/14	58	(1.0)
Pole Planter Slips through Garden Gate	DIA	4/28	48	(2.0)
Double-Jointed Loader Maneuvers in Tight Quarters	DIA	4/28	54	(1.0)
Padded Conveyor Keeps Fruit Bruise-Free	DIA	4/28	58	(0.6)
Floating Bed Loads Heavy-Duty Chains	DIA	6/23	46	(2.0)
Detachable Claw Recovers Missing Torpedoes	DIA	7/7	30	(1.0)
Wave Monitor Synchronizes Dangling Cargo and Heaving Ship	DIA	9/1	32	(1.0)
Drive-In Restaurant Features Computerized Cuisine	DIA	10/13	46	(2.0)
Tractor Attachment Really Digs Vegetables	DIA	10/13	52	(1.0)
Twin Swivelling Tongs Bind Big Wire Coils	DIA	10/27	38	(1.0)
King-Size Hydraulic Crane	DI	10/27	44	(0.3)
Concrete Contour Constructor	DI	12/22	31	(0.4)

913. Electrical Machinery

Diagnosis By Dynamometer	Kemmerer	6/23	144	(6.0)
Revised Air-Conditioning Cycle Improves Cooling and Heating	Trends	1/20	26	(1.0)
Alpha and Bravo Carry Orders to Spacecraft	Trends	1/20	32	(0.7)
Partial Success Reported on Radar for the Railways	Trends	3/3	10	(0.7)
Rugged Tape Recorder Thrives on Abuse	Trends	3/31	38	(0.5)
Electronic Nerves Recognize 99 Percent of the Sounds	Trends	4/28	18	(0.6)
Satellite Inflates, Then Loses Its Skin	Trends	5/12	8	(0.5)
"Talking Machine" Telephones Pictures Coast to Coast	Trends	5/26	12	(1.0)
Mohole Boss Tells the Navy How to Go Deep	Trends	5/26	14	(0.6)
Crystals Focus Light Beam on 131,072 Points	Trends	6/9	34	(0.5)
High-Speed System Transmits Graphs and Charts	Trends	6/23	24	(0.6)
Add-a-Unit System Would Build Efficient Highway Communications	Trends	8/4	14	(1.3)
Rocket's Radar Eyes Map Terrain 102 Miles below	Trends	8/4	16	(0.7)
Infantry's Radar Tracks Multiple Targets in Both Azimuth and Range	Trends	8/18	8	(1.0)
Barber-Pole Projector Aids Clear-Weather Landings	DIA	1/6	28	(2.0)
Decision Cells Simplify Weather-Satellite Data	DIA	1/20	48	(1.0)
Tape Plays On Despite Rugged Ride	DIA	2/3	30	(2.0)
Flame Power Boosts Loudspeaker Output	DIA	2/3	38	(1.0)
Pickup Bias Prolongs LP Life	DIA	3/31	44	(1.0)
Instant-Change Traffic Signs Check Autobahn Congestion	DIA	4/28	56	(1.0)
Kid-Powered Record Tells the Story	DIA	6/9	42	(1.0)
Record Player Lets Owner Carry a Tune	DIA	8/4	44	(1.0)
Video Tape Travels Helical Path To Get the Picture	DIA	12/8	50	(1.0)
Mobile Interception Radar	DI	12/8	59	(0.4)

914. Transportation

Snow Vehicles	(Article)	1/20	139	(6.0)
The Great Garbage Explosion	Barnes	2/3	100	(10.0)
Mass Transit Begins To Move	(Article)	3/31	100	(6.0)
Ford Ahead on Road to LeMans	Wise	4/28	182	(6.0)
Hot Twins & Compact Jets	Wise	9/1	106	(9.0)
'67 Cars	(Article)	9/15	173	(9.0)
'67 Cars	Wise	9/29	108	(10.0)
Grand Prix Design for the Formula	Wise	11/10	176	(8.0)
Merry Christmas, Chief	Kemmerer	12/8	164	(4.0)
SST: Swing Wing or Delta	Wise	12/22	100	(7.0)
Supersonic Transport Starts into the Mockup Stage	Trends	2/17	14	(0.6)
Idea Car Takes the Wraps off Nearly Ready Gadgets	Trends	3/3	14	(1.0)
Real-Road Data Shake Up the Cadillacs	Trends	3/3	16	(0.6)
DC-10 Candidate Would Carry 550 Passengers	Trends	3/17	8	(0.7)
Starfighter Makes a No-Runway Takeoff	Trends	4/14	8	(0.7)
Three Bombs Are Carried in Space Designed for Two	Trends	4/28	20	(0.7)
Air Mattress Protects Saturn from Technicians' Feet and Butterfingers	Trends	5/12	16	(0.5)
Air Force Plans a Look at Lifting-Body Vehicles	Trends	5/26	8	(0.9)
Supply 'Chute Takes Orders from the Ground	Trends	5/26	10	(0.7)
"Wrist Twist" Steering Clears First Public-Acceptance Hurdle	Trends	6/9	8	(1.0)
Hinged Ship Promises Efficient Use of Locks	Trends	6/9	10	(0.5)
New Tests Are Needed for Rapid SST Development	Trends	6/9	10	(0.5)
Scaled-Up Air-Cushion Vehicle Will Carry a Double Load	Trends	6/9	12	(1.0)
Two Deep Divers Slide down the Ways	Trends	6/9	14	(1.3)
Lunar Walker Tries Toting Crippled Tots	Trends	6/9	16	(1.4)
Monorail Drops an Elevator to Pick Up Passengers	Trends	6/23	12	(0.6)
Silent Sub Will Drift up the East Coast	Trends	7/7	8	(1.0)
SST Nears Point of No Return	Trends	7/7	10	(2.0)
"Private Rapid" Carries Each Commuter from House to Office	Trends	8/18	12	(1.0)
Best Reentry Method: Riding a Helicopter down from Orbit?	Trends	9/15	8	(1.0)

Hidden Engines Promise Fast V/STOL's	Trends	9/29	8	(0.7)
Trapped Air Floats Sea Truck across the Water	Trends	10/13	10	(0.4)
Air-Cushion Vehicles Are Slated for Mass Production	Trends	10/27	10	(0.6)
Helicopter's Rotor Folds away for 500-mph Flight	Trends	11/10	8	(0.7)
Northeast Corridor Cars Get Super-balanced Wheels	Trends	11/10	14	(0.6)
Army Designs New Transporter around Its Cargo	Trends	11/24	10	(0.6)
Jet Jeep Tests Dust Separator	Trends	11/24	12	(0.7)
New Car-Material Concept: Any Fiber Is Combined with Any Resin	Trends	11/24	14	(0.7)
Moon River Will Spring Along on Titanium Wheels	Trends	12/8	10	(0.7)
GM Says Electric Car Is 10 Years Away	Trends	12/8	12	(2.3)
Harmonic Drives Maneuver Robot Arms	DIA	1/20	46	(1.0)
Quick-Change Jet Palletizes Passenger Seats	DIA	3/17	40	(2.0)
Mechanical Helmsman Lets Sailors Relax	DIA	3/17	46	(0.6)
Six-Armed Cable Car Creeps around Obstructions	DIA	5/12	39	(1.0)
Boat-Borne Cutter Mows Underwater Weeds	DIA	6/9	49	(1.0)
Kangaroo Car Carries Trailer in Its Pouch	DIA	12/8	44	(2.0)
Floating Picture Frame	PR	11/10	6	(0.4)
Electronic Warfare	PR	12/8	6	(0.4)
Self-Contained Bubble Car Offers Low-Cost Transport	DI	10/13	37	(1.0)
Fastback Opel Joins Safety Kick	DI	10/13	43	(1.0)
Flameless Electric Car	DI	10/27	44	(0.5)
"Spica" Speedboats	DI	10/27	45	(0.5)
Faster and Safer	DI	11/24	33	(0.4)
Potpourri Minicar	DI	11/24	33	(0.4)
Small Yard 'Extrudes' Massive Ships	DI	12/8	62	(1.0)
Flip-Top Two-Seater	DI	12/22	30	(0.8)

915. Instruments

Air Tool Skins a Patient By Removing 0.001-in. Layers	Trends	1/6	12	(0.5)
Seven-Telescope Earth Girdle Will Watch Over Apollo Astronauts	Trends	3/17	16	(0.7)
Two Advances Are Reported in 3D "Snapshot" Making	Trends	4/14	21	(1.0)
How to Measure Gravity on the Moon	Trends	5/12	19	(0.5)
New Recorder Sketches Sounds by Listening to Magnetic Tape	Trends	9/29	12	(0.7)
Transmitted Energy Indicates Particle Density	Scan	1/6	133	(0.5)
Optical Sensor Eliminates Flowmeter Variations	Scan	3/3	119	(0.5)
Calibrated Spring Guide Indicates Clamp Force	Scan	4/14	186	(0.5)
Ultrasonic Ticker Measures Hardness	Scan	5/26	162	(1.0)
Superimposed Images Indicate Vertical Distance	Scan	6/9	140	(0.5)
Prism Provides Readout-Color Option	Scan	6/23	175	(0.5)
Camera Gets Black-and-White Evidence against Speeding Motorist	DIA	1/20	43	(1.0)
Ultrasonic Echo Guides Surgeon's Probe	DIA	2/17	46	(1.0)
Capacitor Charging Time Determines Film Exposure	DIA	3/3	37	(1.0)
Conductivity Change Warns of Water Contamination	DIA	3/3	44	(0.5)
Air-Powered Instruments Speed Delicate Surgery	DIA	4/28	52	(1.0)
Front-Projection System Superimposes Slides and Real Life	DIA	5/12	44	(1.0)
Magnetically Controlled Escapement Turns Flashcube Adapter	DIA	6/9	52	(0.6)
Rugged Camera Will Scan Martian Landscape	DIA	6/23	50	(1.0)
Liquid Lens Takes Blur Out of TV Picture	DIA	6/23	53	(1.0)
Spray Gun Glues on Heart-Sensing Electrodes	DIA	8/4	46	(1.0)
Series-Connected CdS Cells Prevent Underexposure	DIA	10/13	50	(1.0)
Print Paper Needs No Negative	DIA	11/10	46	(0.6)
Cartridge-Packing Pistol Camera Takes Movies Single-Handed	DIA	11/24	42	(2.0)
Baited Camera Spies on Deep Sea Denizens	DIA	12/8	47	(1.0)
Code Bands on Gyro Ball Tell Plane's Attitude	DIA	12/8	53	(1.0)
Two-Air-Force Fighter	DI	12/8	58	(0.4)
Single Lens Rolleiflex	DI	12/8	59	(0.6)

916. Fabricated Metal Products

"Slow-Breaking" Element Catapults Jets Safely	Trends	6/23	16	(0.6)
Quick-Fit Wrench Jaw Tightens Itself	Scan	3/3	119	(0.5)
Grooved Slot Provides One-Way Rope Grip	Scan	3/17	182	(0.5)
Toys Children Christmas	Scan	12/8	160	(4.0)
Mechanical Partner Tests Ping Ponger's Skill	DIA	1/20	50	(0.6)
Dial-a-Blade Razor Shaves with Stainless-Steel Band	DIA	2/3	41	(0.5)
Shoe Polisher Combines Vacuum Cleaner and Buffer	DIA	2/3	41	(0.5)
CO_2 Powers Scuba Diver's Five-Shooter	DIA	2/17	42	(1.0)
Buzzsaw Brake Makes Workshop Safer	DIA	5/26	39	(1.0)
Telescoping Cylinder Supercharges Underwater Elephant Gun	DIA	6/9	46	(1.0)